

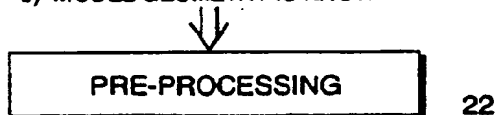
# FIG. 1

## NEW METHOD

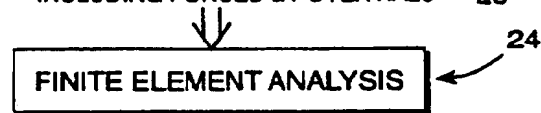


### ASSUMPTIONS:

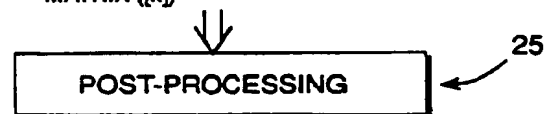
- 1) GOVERNING EQUATION:  $\{f\}=[k]\{x\}$
- 2) FORCES ( $\{f\}$ ) ARE KNOWN
- 3) MATERIAL PROPERTIES ( $[k]$ ) ARE UNKNOWN
- 4) POTENTIALS ( $\{x\}$ ) ARE KNOWN OR DEFINED
- 5) MODEL GEOMETRY IS KNOWN



- DESIGN MODEL GEOMETRY
- NODE & ELEMENT GENERATION
- INPUT BOUNDARY CONDITIONS, INCLUDING FORCES & POTENTIALS



- SOLVE FOR MATERIAL PROPERTIES MATRIX ( $[k]$ )

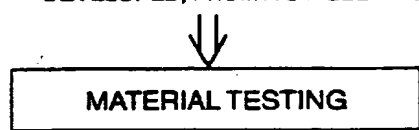


- CONVERSION OF MATERIAL PROPERTIES MATRIX ( $[k]$ ) TO FORMATS, HAVING A SPECIFIC ORDER, OF SMALL VOLUME INCREMENTS, WITH REPRESENTATIVE MATERIAL PROPERTY COEFFICIENTS.

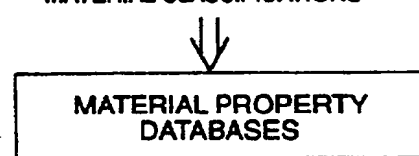
## INDUSTRY, GOVERNMENTAL AGENCY RESEARCH INSTITUTES



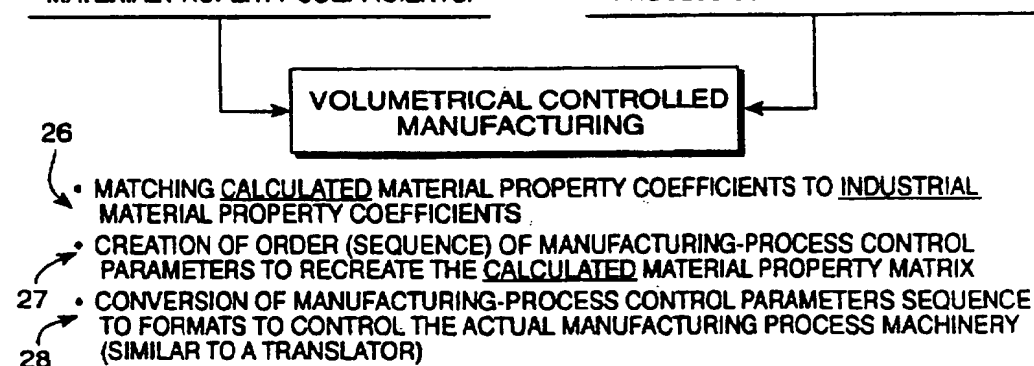
- BY VARYING MANUFACTURING-PROCESS CONTROL PARAMETERS (EX., SPEED, TEMP., PRESSURE, ETC.), NUMEROUS NEW MATERIALS ARE DEVELOPED, FROM A SINGLE PROCESS



- DEFINITION OF MATERIAL PROPERTIES OF A MATERIAL; NEEDED FOR MATERIAL CLASSIFICATIONS



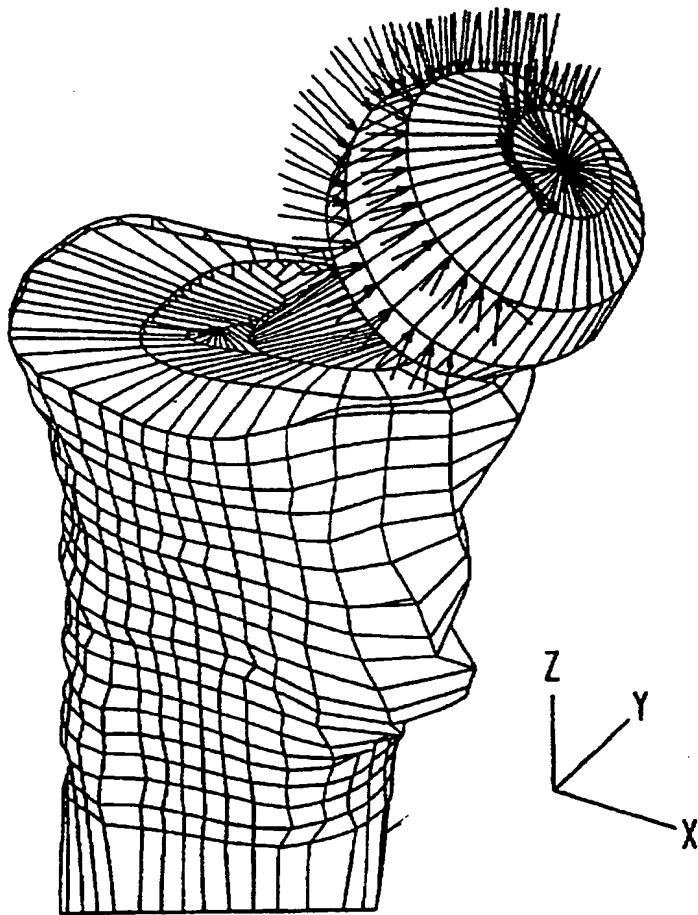
- ARCHIVES OF MATERIAL PROPERTY COEFFICIENTS WITH THEIR CORRESPONDING MANUFACTURING-PROCESS CONTROL PARAMETERS



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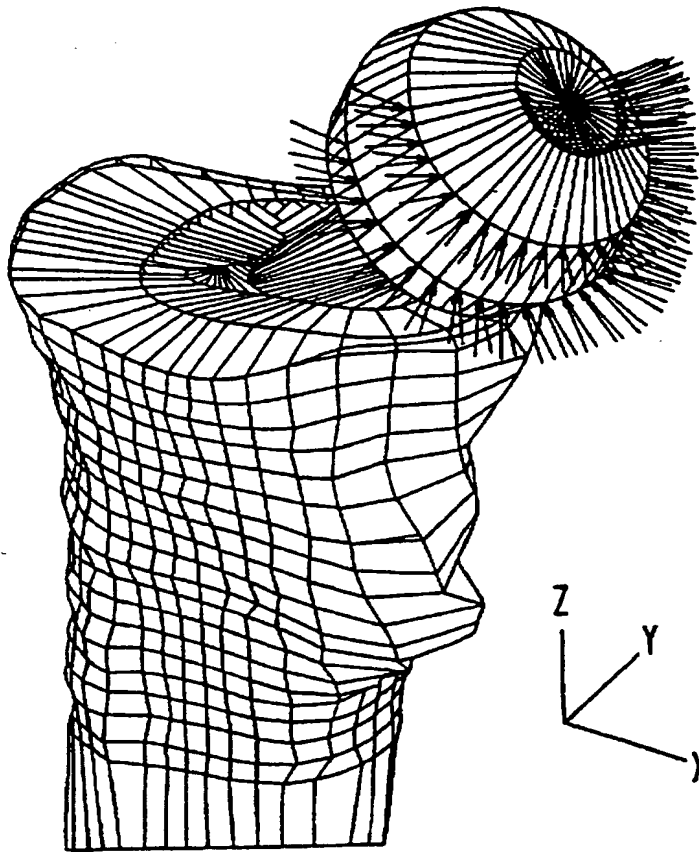
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FIG. 2A



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FIG. 2B



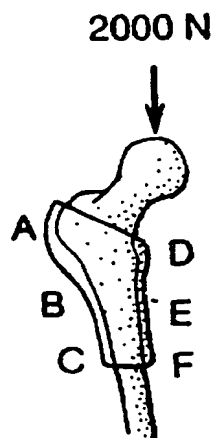
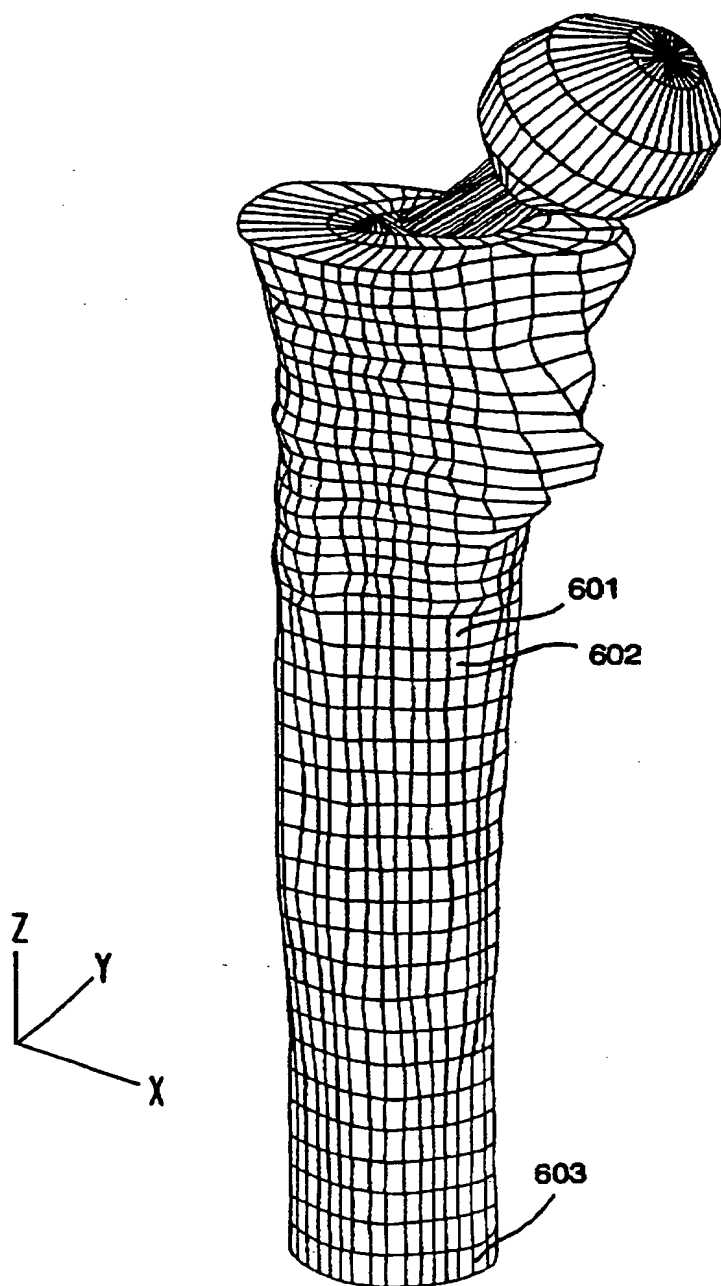


FIG. 3A

	INTACT FEMUR
A	$0.221 \pm 0.057$
B	$0.875 \pm 0.119$
C	$0.698 \pm 0.122$
D	$1.217 \pm 0.150$
E	$1.315 \pm 0.131$
F	$1.208 \pm 0.131$

FIG. 3B

FIG. 4



M1-1	E1-1	$\sigma$ 1-1	PROCESS	PROCESS PARAMETERS
M1-2	E1-2	$\sigma$ 1-2	PROCESS	PROCESS PARAMETERS
$\vdots$	$\vdots$	$\vdots$	$\vdots$	$\vdots$
M1-n	E1-n	$\sigma$ 1-n	PROCESS	PROCESS PARAMETERS

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FIG. 5A

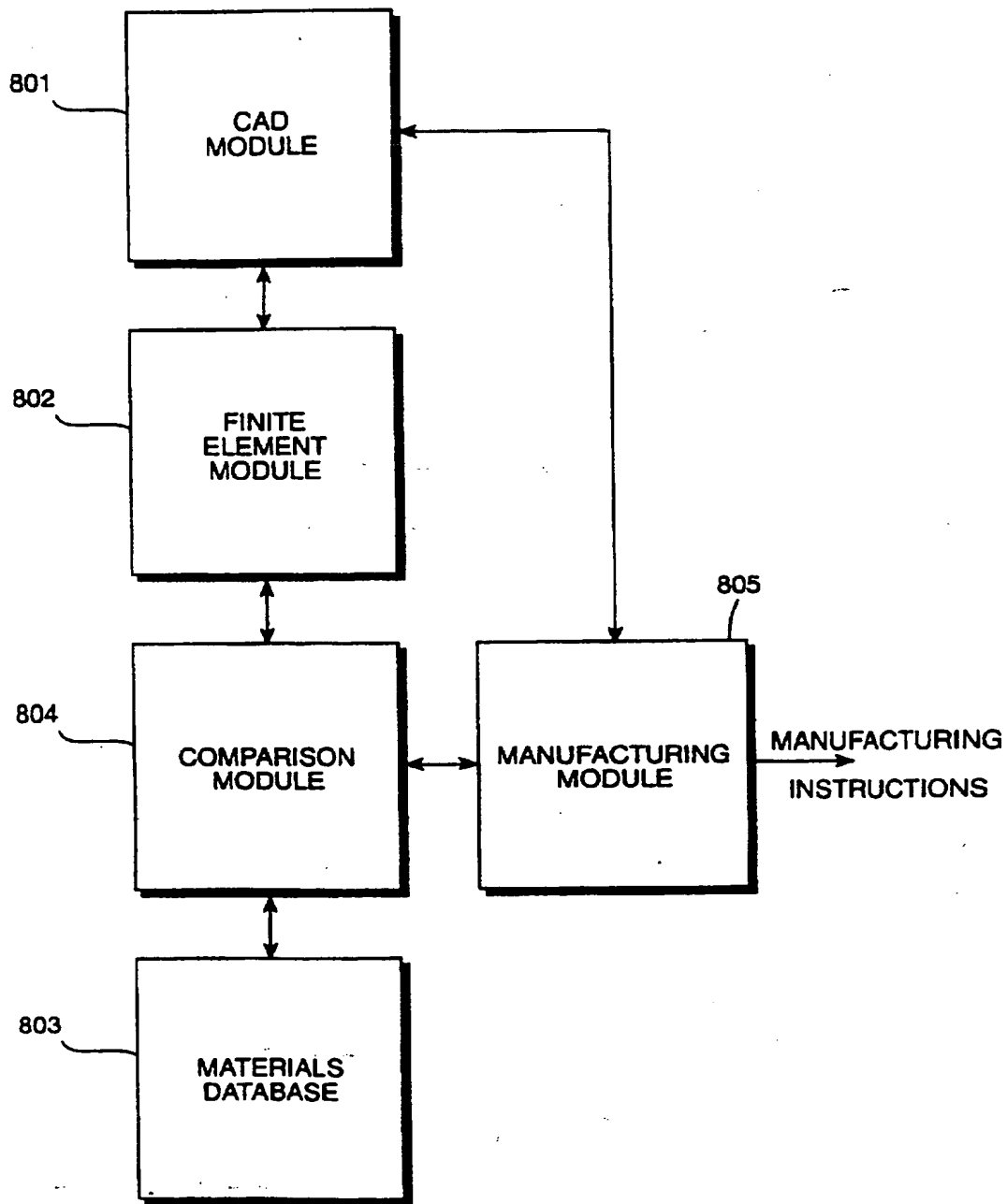
M2-1	$\sigma$ '2-1	PROCESS	PROCESS PARAMETERS
M2-2	$\sigma$ '2-2	PROCESS	PROCESS PARAMETERS
$\vdots$	$\vdots$	$\vdots$	$\vdots$
M2-n	$\sigma$ '2-n	PROCESS	PROCESS PARAMETERS

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FIG. 5B

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FIG. 6



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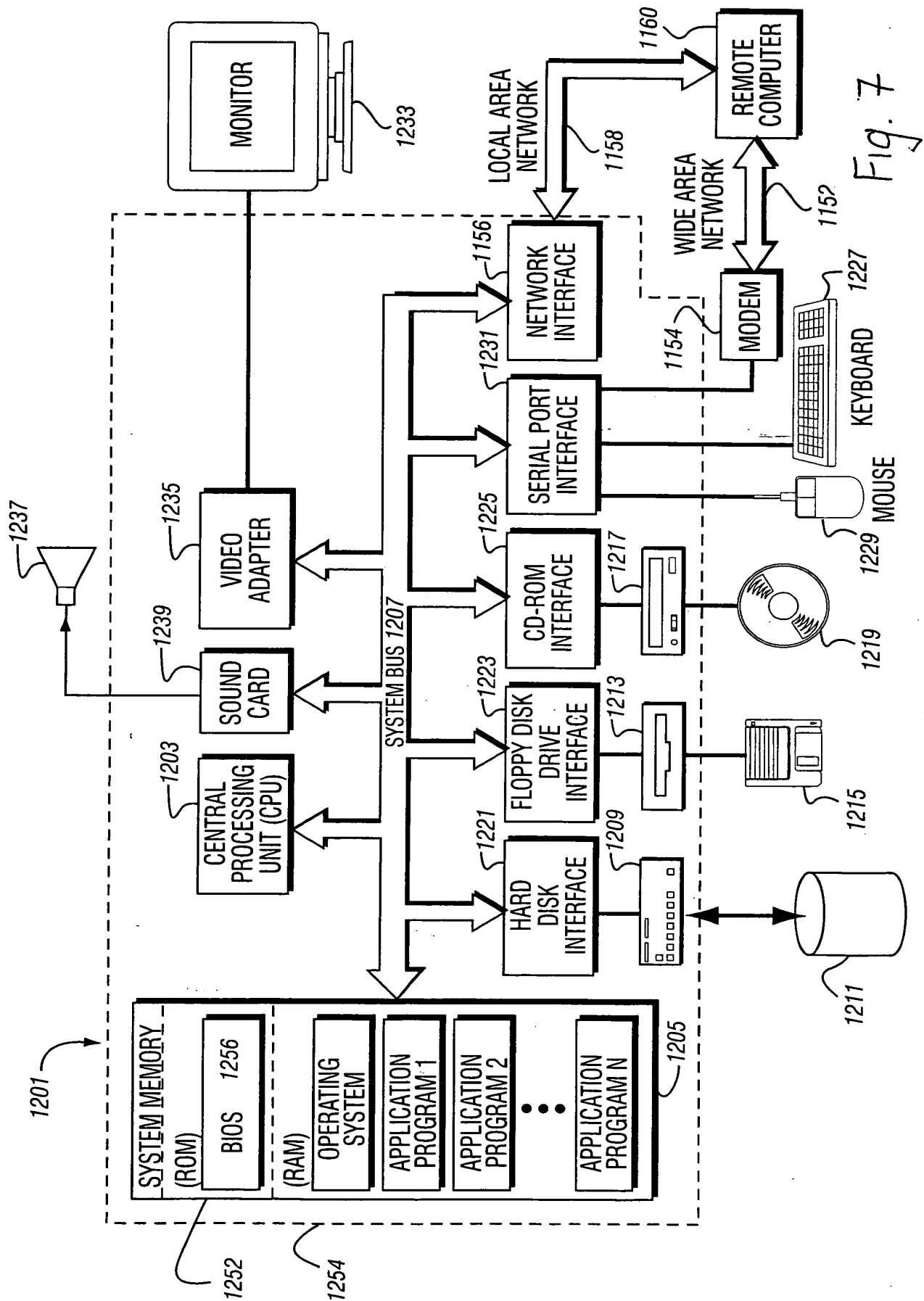


Fig. 7



FIG. 8

